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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/905,676	07/13/2001	Nicholas Jon Ede	660097.408	4816

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EXAMINER

TRAN, MY CHAU T

ART UNIT	PAPER NUMBER
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1639

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/905,676	<b>Applicant(s)</b> EDE ET AL.	
	<b>Examiner</b> MY-CHAU T TRAN	<b>Art Unit</b> 1639	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 2-5, 7-10, 13-17, 19, 20, 22, 23, and 30-33 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 is/are allowed.
- 6) ☒ Claim(s) 1, 6, 11, 12, 18, 21, 25-29, and 34-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/13/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some    \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/17/04 has been entered.

### *Status of Claims*

2. Applicant's amendment filed 2/17/04 is acknowledged and entered. Claims 1, 11, 18, and 25-26 have been amended. Claims 34-35 have been added.
3. Claims 1-45 are pending.
4. This application claims priority to two provisional applications. These applications are 60/218, 236 filed 7/14/2000 and 60/282,099 filed 4/06/2001.
5. Claims 30-33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to *nonelected inventions*, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper filed 10/16/02.

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6. Applicant has elected the following species for the elected invention (Claims 1-29) in

Paper filed 10/16/02:

a. A species of a chelating metal as the species bound to the grafted polymeric surface.

7. Claims 2-5, 7-10, 13-17, 19-20, and 22-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to *nonelected species*, there being no allowable generic or linking claim. Election was made **without** traverse in Paper filed 10/16/02.

8. Claims 1, 6, 11-12, 18, 21, 25-29, and 34-45 are treated on the merit in this Office Action.

#### ***Withdrawn Rejections***

9. In view of applicant's amendments of claims 1, 11, and 18, the rejection of claims 1, 6, 11-12, and 18 under 35 USC 102(b) as anticipated by Goldberg et al. (US Patent 5,804,263) has been withdrawn.

10. In view of applicant's amendments of claim 1, the rejection of claims 1 and 6 under 35 USC 102(e) as anticipated by M<sup>c</sup> Pherson et al. (US Patent 6,013,855) has been withdrawn.

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11. In view of applicant's amendments of claims 1, 11, 18, and 25-26, the rejection of claims 1, and 25-29 under 35 USC 103(a) as being obvious over M<sup>c</sup> Pherson et al. (US Patent 6,013,855) in view of Lukhtanov et al. (US Patent 6,339,147) has been withdrawn.

***New Rejections – Necessitated by Amendment***

***Claim Rejections - 35 USC § 112***

12. Claims 1, 6, 11-12, 18, 21, 25-29, and 34-45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. (This is a new matter rejection.)

The presently claimed surface recites an activated modular grafted polymeric surface. The activated modular grafted polymeric surface comprises the modular physical unit, which comprises a first polymer, a second polymer, and an activating moiety.

The recitation of 'modular physical unit' claimed in claims 1, 34, 35, and 45, have no clear support in the specification and the claims as originally filed. The specification in page 8 disclosed '*The term "modular" means that the activated grafted polymeric surface is in the form of a plurality of physical units which are suitable for use in a set of simultaneous chemical reactions, and which provide reproducible chemical properties. These may be of a wide variety of desired shapes, such as lanterns, gears, pins, pucks, discs, beads, microtitre plates, sheets, etc.*' (lines 7-11) is not support for 'modular physical unit'. Because the specification define that

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the term “modular” to mean the “physical” shape of the activated grafted polymeric surface, it does not support the limitation of the claim, which recites ‘modular physical unit’.

The recitation of ‘modular physical unit that comprises a first polymer, a second polymer, and an activating moiety’ claimed in claims 1, 34, 35, and 45, have no clear support in the specification and the claims as originally filed. The specification is silent on the limitation of a modular physical unit that comprises a first polymer, a second polymer, and an activating moiety.

Therefore, the scope of the invention as originally disclosed in the specification would not encompass the scope of the claimed limitation of ‘modular physical unit’, ‘a first polymer’, and ‘a second polymer’.

If applicants disagree, applicant should present a detailed analysis as to why the claimed subject matter has clear support in the specification.

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1, 6, 11-12, 18, 21, 25-29, and 34-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The recitation of “activating moiety” of claim 1 and the recitation of “reagent” of claim 11 is vague and indefinite because it is unclear as to the correlation between these terms (i.e. are the term “activating moiety” and “reagent” synonymous to each other?).

b. The recitation of “activating moiety” of claim 35 and the recitation of “reagent” of claim 37 is vague and indefinite because it is unclear as to the correlation between

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these terms (i.e. are the term "activating moiety" and "reagent" synonymous to each other?).

c. Claims 26 and 41 vague and indefinite because it contains an improper Markush format. Furthermore, it is unclear how claims 26 and 41 further limit the subject matter of the previous claims 25 and 40 respectively.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 6, 11, 34-37, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Maeji et al. (*Reactive Polymers*, 1994, 22:203-212).

Maeji et al. disclose a surface comprises a polymer radiation grafted to a polymer rigid pin support for peptide synthesis (Abstract; pg. 203, right col., line 14 to pg. 204, left col., line 4). The pins (modular physical units) are arranged in an 8-column, 12-row format. The surface comprises polyacrylic acid (second polymer) radiation grafted to the polyethylene (first polymer) pins (pg. 204, left col., lines 14-23). The radiation comprises gamma-irradiation (pg. 205, right col., lines 4-7). The polyacrylic acid further comprise of an amine handle (activating moiety/reagent) wherein the peptide are attached (pg. 205, right col., lines 18-23; pg. 207, right col., lines 25-32). Therefore, the surface of Maeji et al. anticipates the presently claimed surface.

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4. Claims 1, 6, 11, 21, 34-35, 37, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Maeji et al. (*Peptide Research*, **1995**, 8(1):33-37).

Maeji et al. disclose a surface comprises a polymer radiation grafted to a polymer rigid pin support for peptide synthesis (Abstract; pg. 33, middle col., line 30 to pg. 33, right col., line 2). The pins (modular physical units) are arranged in the modular format of 96 pins. The surface comprises polyacrylic acid (second polymer) radiation grafted to the polyethylene (first polymer) pins (pg. 34, left col., lines 11-31). Additionally, a linker is added between the peptide and graft. The radiation comprises gamma-irradiation. The polyacrylic acid further comprise of an amine handle (activating moiety/reagent) wherein the peptide are attached (pg. 34, left col., lines 11-31). Therefore, the surface of Maeji et al. anticipates the presently claimed surface.

5. Claims 1, 11, 34-35, 37, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Hong et al. (*Synthetic Metals*, **6/1999**, 102(1-3): 857-1793).

Hong et al. disclose a film surface (modular surface) comprises a poly(phenylenevinylene) (first polymer) grafted with triethylenetetramine (second polymer) (pg. 1215, left col., lines 16-23, and right col., lines 11-21). The triethylenetetramine is coordinated with a lanthanide metal (chelating metal) (fig. 1). Therefore, the surface of Hong et al. anticipates the presently claimed surface.

6. Claims 1, 6, 11, 21, 29, 34-37, and 44-45 are rejected under 35 U.S.C. 102(a) as being anticipated by Eldin et al. (*J. Molec. Catalysis B: Enzymatic*, **12/1999**, 7(5-6):251-261).

Eldin et al. disclose a membrane surface (modular surface) comprises a Teflon (polytetrafluoroethylene) (first polymer) membrane grafted by  $\gamma$ -radiation with acrylic monomers (second polymer) (Abstract; pg. 252, left col. 44 to right col., line 29). Enzymes,  $\beta$ -galactosidase, are attached to the surface via the coupling agent such as glutaraldehyde or cyanuric chloride and between the coupling agent and the acrylic monomers is the spacer unit 1,6-hexamethylenediamine (fig. 1). Therefore the surface of Eldin et al. anticipates the presently claimed surface.

7. Claims 1, 6, 11, 34-35, 37, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Forskningscenter RISØ (WO 90/02749).

Forskningscenter RISØ discloses a polymer substrate (first polymer) grafted with polystyrene (second polymer) for use in peptide synthesis (Abstract; pg. 5, lines 11-32; pg. 7, lines 11-25). The polymer substrate can be fashioned in any form such as sheet, bead or rod (pg. 7, lines 4-10) (modular surface). The grafting process comprise  $\gamma$ -irradiation (pg. 14, line 15 to pg. 15, line 14). The polystyrene-grafted polymer substrate is functionalized with a chemical functionality to facilitate the an anchoring linkage between the polystyrene moieties and the peptide (pg. 17, lines 24-32; pg. 20, lines 11-30). Therefore, the surface of Forskningscenter RISØ anticipates the presently claimed surface.

#### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1, 6, 11, 25-26, 34-37, and 40-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeji et al. (*Reactive Polymers*, 1994, 22:203-212) and Lukhtanov et al. (US Patent 6,339,147).

Maeji et al. disclose a surface comprises a polymer radiation grafted to a polymer rigid pin support for peptide synthesis (Abstract; pg. 203, right col., line 14 to pg. 204, left col., line 4). The pins (modular physical units) are arranged in an 8-column, 12-row format. The surface comprises polyacrylic acid (second polymer) radiation grafted to the polyethylene pins (pg. 204, left col., lines 14-23). The radiation comprises gamma-irradiation (pg. 205, right col., lines 4-7). The polyacrylic acid further comprise of an amine handle (activating moiety/reagent) wherein the peptide are attached (pg. 205, right col., lines 18-23; pg. 207, right col., lines 25-32).

The surface of Maeji et al. does not expressly include a Schiff base type linkage between an amine moiety and the biological molecule.

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Lukhtanov et al. disclosed the Schiff base type covalent linkage that covalently link oligonucleotide to a solid support (col. 3, lines 38-41). The advantage of the Schiff base type covalent linkage is its stability and high coupling densities on the surface of the solid support (col. 4, lines 21-37).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a Schiff base type linkage between an amine moiety and the biological molecule as taught by Lukhtanov et al. in the grafted polymeric surface of Maeji et al. One of ordinary skill in the art would have been motivated to include a Schiff base type linkage between an amine moiety and the biological molecule in the grafted polymeric surface of Maeji et al. for the advantage of providing a stable linkage and high coupling densities on the surface of the solid support. Since both Maeji et al. and Lukhtanov et al. disclose immobilizing biomolecules onto a solid support via the amine group on the surface of the support (Maeji: pg. 205, right col., lines 18-23; Lukhtanov: col. 3, lines 38-41). Furthermore, one of ordinary skill in the art would have reasonably expected success in the combination of Maeji et al. and Lukhtanov et al. because Lukhtanov et al. disclose in the example the attachment of oligonucleotide to an amine on the surface of the solid support via a Schiff base type linkage (Example 6).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MY-CHAU T TRAN whose telephone number is 571-272-0810.

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The examiner can normally be reached on Mon.: 8:00-2:30; Tues.-Thurs.: 7:30-5:00; Fri.: 8:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ANDREW WANG can be reached on 571-272-0811. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mct  
May 17, 2004

  
PADMASHRI PONNALURI  
PRIMARY EXAMINER